2,5 мг інданамідом. При величині КПН 1,0-1,5 дози вищезгаданих препаратів зменшувалась вдвічі. Проведене курсове лікування з використанням препаратів І лінії (Д або ІАПФ+ Д чи БРА ІІ+ Д) за контролю КПН у більшості обстежених хворих привело до нормалізації АТ. Проведене повторне обстеження з визначення КПН виявило зростання у цих хворих КПН ≥ 1,5.

Висновки

1. Нирковий механізм «тиск-натрійурез» у хворих на есенційну гіпертензію (ЕГ) ІІ ст. за даними коефіцієнту пресорного натрійурезу (КПН) порушений переважно у хворих з циркадіанними ритмами АТ -«non dipper» та «night picker».

2. У значної частини хворих з добовими ритмами «non dipper» (39%) та «night picker» (50%) важливим механізмом прогресування ЕГ є гіперволемія.

3. Зниження коефіцієнту «пресорного натрійурезу» < 1,5 у поєднанні з низьким добовим індексом циркадіанним ритму АТ – нові фактори ризику прогресування ЕГ.

4. Контроль за величиною КПН в динаміці комбінованого АГ – лікування з використанням діуретиків (гіпотіазид, індапамід) дозволяє не тільки обґрунтувати їх призначення, але й оптимізувати ефективну дозу та обмежити побічні прояви.

Література:

1. Gurevich M.A. Mesto sovremennyh diuretikov v lechenii arterial'noj gipertonii u pacientov s ozhireniem / A.M. Gurevich // Spravochnik poliklinicheskogo vracha. – 2010. - №88. – S. 43-46.

2. Docenko S.YA. Prihil'nist' do antigipertenzivnoї terapiї hvorih z nekontrol'ovanoyu arterial'noyu gipertenzieyu / S.YA. Docenko // Zaporozhskij med. zh. – 2013. - №2. – S.14-17.

3. Koncepciya Derzhavnoї programi profilaktiki i likuvannya arterial'noї gipertenziї v Ukraïni na 2011–2020 roki // Arterial'na gipertenziya. – 2011. - №2(16). – S. 12-15.

4. Kuz'minova N.V. Ocinka klinichnoї efektivnosti trivaloї kombinovanoї terapiї u hvorih na gipertonichnu hvorobu / N.V. Kuz'minova // Biomedical and biosocial anthropology. – 2013. - №21. – S.199-202.

5. Lapshin O.V. Kombinovana antigipertenzivna terapiya – suchasnij trend likuvannya / O.V. Lapshin // Liki Ukraïni. – 2013. – T1. - №167. – S. 30-35.

6. Makolkin V. I. Vklyuchenie tiazidnogo diuretika v kombinirovannuyu antigipertenzivnuyu terapiyu celesoobrazno / V. I. Makolkin // Kardiovaskulyarnaya ter. i profilaktika. – 2008. - № 8. – S. 80-84.

7. Nekrasova A.A. Pochki kak odin iz organov-mishenej pri gipertonicheskoj bolezni / A.A. Nekrasova // Terapevt. arh. – 1987. – №8. – S.143-146.

8. Fushtej I.M. Diferencijovanij pidhid do likuvannya hvorih na gipertonichnu hvorobu II stadiї / I. M. Fushtej, V. O. Mochonij // J. Clin. Exp. Med. Res. – 2015. – T3. - №4. – S.636-643.

9. Hypertension in high-risk patients: beware of the uderuse of effective combination therapy (results of the PRACTIC study) / J. Amar, L. Vaur, M. Perret [et all.] // J. Hypertens. – 2002. – Vol. 20. – P. 79-84.

10. Kaplan's Clinical Hypertension / Kaplan N.M., Kaplan N.M., Victor R.G. [et all.] . Lippincott Williams & Wilkins – Philadelphia, 10th-Ed. – 2010. – 560 p.

11. Reappraisal of European guidelines on hypertension management: a European Society of Hypertension Task Force document / G. Mancia, S. Laurent, E. Agabiti-Rosei [et all.] // J. Hypertension. – 2009. – Vol. 27. – P. 2121-2158.

12. The ALLHAT Officers and Coordinators for the ALLHAT Collaborative Research Group. Major outcomes in high-risk hypertensive patients randomized to angiotensin-converting enzyme inhibitor or calcium channel blocker vs. diuretic: the Antihypertensive and Lipid Lowering treatment to prevent Heart Attack Trial (ALLHAT) //JAMA. – 2002. – Vol. 288. – P. 2981-2997.

13. The HYVET Study Group. Treatment of Hypertension in Patients 80 Years of Age or Older / N.S. Beckett, R. Peters, A.E. Fletcher [et all.] // N. Engl. J. Med. – 2008. – Vol. 358. – P. 1887-1898.

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DYNAMICS OF MORPHOMETRIC CHANGES OF COMMON BILE DUCT IN HUMAN FETUSES AND NEWBORNS

МОРФОМЕТРИЧНІ ОСОБЛИВОСТІ РОЗВИТКУ СПІЛЬНОЇ ЖОВЧНОЇ ПРОТОКИ У ПЛОДІВ ТА НОВОНАРОДЖЕНИХ ЛЮДИНИ

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A dynamics of changes of length and diameter of different parts of common bile duct has been traced on 65 corpses of human fetuses and newborns by means of macro- and microscopic preparation and morphometry methods. It has been established that the growth of common bile duct has asynchronous character with alternation of the periods of acceleration (5-7 and 9-10 months) and delay (8 months) during the fetal period of human ontogenesis. The features of the growth of common bile duct are caused by different character of its parts formation. The original method of determining the evaluation criteria of development of common bile duct in fetuses and newborns is based on the obtained data and can be used for an early prenatal diagnosis of malformations and congenital diseases of extrahepatic bile ducts.
Key words: common bile duct, hepatic-pancreatic ampulla, morphogenesis, fetus, newborn, human being.

Простежена динаміка зміни розмірів різних відділів спільної жовчної протоки на 65 трупах плодів та новонароджених людини за допомогою методів макро-мікропрепарування та морфометрії. Встановлено, що ріст спільної жовчної протоки упродовж плодового періоду онтогенезу відбувається асинхронно з чергуванням періодів прискорення (5-7-й та 9-10-й місяці) та сповільнення (8-й місяць). Особливості росту спільної жовчної протоки у плодів та новонароджених зумовлені різними темпами зміни розмірів її відділів. На підставі отриманих даних розроблено оригінальний «Спосіб визначення критеріїв оцінки розвитку спільної жовчної протоки у плодів та новонароджених», який може бути використаний для своєчасної пренатальної діагностики вад розвитку та природжених захворювань позапечінкових жовчних проток людини.
Ключові слова: спільна жовчна протока, печінково-підшлункова ампула, морфогенез, плід, новонароджений, людина.

Introduction. Actuality of problem of normal prenatal development (PD) of biliary tract is caused by the increase of frequency of its congenital malformations, which is about 6-8% of all defects and have no tendency to decrease it [8]. The greatest number of congenital defects of biliary system is detected in site of the common bile duct (CBD). In the known morphological investigations the significant attention is devoted to study of patterns of structural and spatial changes of extrahepatic bile ducts during the some periods of intra- and postnatal development of human being [3, 5]. The anlage and structural transformation of gallbladder and some segments of biliary tract have been detailed during embryogenesis [4]. Along with it, the patterns of morphological change of the individual parts of CBD during PD still remain obscure. However, for the early detection of congenital pathology of CBD the reliable criteria for evaluating its development is needed during the entire gestational period of ontogenesis and last ones would be based on a coherent chronological study of the dynamics of morphometric changes CBD in human fetuses and newborns.

Purpose of the research: to determine the specific morphometric peculiarities of development of common bile duct in human fetuses and newborns.

Material and methods. The investigation have been performed on 65 corpses of human fetuses and newborns from 82,0 to 396,0 mm of parietal-coccygeal length (PCL) by using of macro-and microscopic preparation and morphometry methods. All data was processed by the methods of variation statistics with calculation the Student's test using the software package Primer of Biostatistics, 4th Edition, S.A.Glantz, McGraw-Hill. To reject the null hypothesis the significance level was used equal to $p<0,05$.

Results of the research and its discussion. It has been established that during 4-5th months of PD such 3 parts can be determined in CBD: retroduodenal – is situated behind the upper part of the duodenum; pancreatic – in the thickness of the pancreatic head; intramural – into the medial wall of the descending part of duodenum. The supraduodenal part of CBD is detected into the deepness of hepatoduodenal ligament since the beginning of 6th month of PD.

During the fetal period of ontogenesis the total length of CBD is increasing 5,6 times, in newborns it is up to 24,77±0,30 mm PCL. Increase of the length of CBD is a linear and asynchronous with alternating periods of acceleration and deceleration of its growth. The first period of an accelerated growth of CBD ($p <0.001$) continues from 5th till 7th months. A deceleration of its growth is occurs during 8th month. A second period of acceleration of growth of CBD is revealed since the 9th month till the birth ($p<0,001$).

Comparative dynamics of increasing the length of the different parts of the common bile duct has been analysed during the fetal period and in newborns (fig. 1).

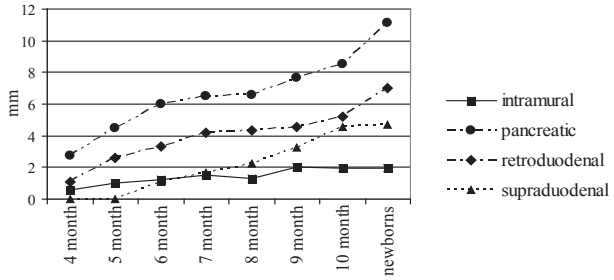

Fig. 1. Comparative dynamics of increasing the lengths of different parts of common bile duct in human fetuses and newborns (M±m).

The greatest increase (in 6,4 times) was in the length of retroduodenal part of CBD ($p<0,001$) which size is up to 7,00±0,090 mm in newborns. The least increase (in 3,2 times) has been detected in the length of intramural part of CBD ($p<0,001$) which size was 1,93±0,081 mm in newborns. The increase of the lengths of supraduodenal and pancreatic parts was 4,4 and 4,1 times accordingly ($p<0,001$) and its indices in newborns were up to 4,69±0,13 and 11,14±0,24 mm proportionally.

However, increasing the length of individual parts of CBD is characterized by the different rates. In particular the growth's character of pancreatic part of CBD corresponds to increase its total length. The growth of retroduodenal part of CBD is accelerated from 4th till 7th months ($p<0,001$) and it has period of deceleration in 8-9th months. A reliable increase of its length was again detected just before the birth ($p<0,001$). The linear character of growth of supraduodenal part of CBD was detected from 6th till 10th months ($p<0,001$) without the reliable changes of its length in newborns. The growth of intramural part of CBD is undulating with a slow increase its length during the 4th-7th months and a stabilization of its growth in the 8th month and the reliable acceleration of its growth during the 9th month ($p<0,001$). In newborns its length is non reliable change.

When analysing the dynamics of increase the diameter of different parts of CBD in the fetuses and newborns (fig. 2) it has been established that the increase of diameter of pancreatic part is a linear and other parts ones – an undulating with the periods of acceleration and deceleration.

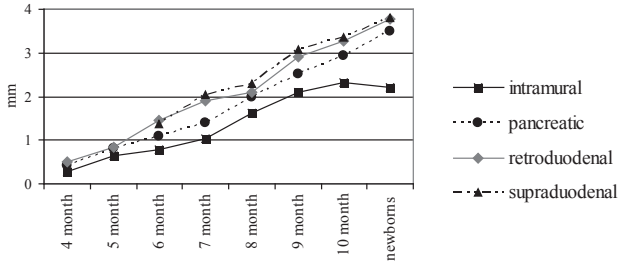

Fig. 2. Comparative dynamics of increasing the diameters of different parts of common bile duct in human fetuses and newborns (M±m).

We consider that the linear increase the diameter of pancreatic part of CBD caused by its position in the thickness of the pancreas, this last one is as a static factor [2]. The growth's rates of the diameters of supra- and retroduodenal parts of SBD were almost identical with the periods of acceleration until the 7th month and from 9th months till the birth (p<0,001), and the period of deceleration during the 8th month (p>0,05). Such dynamics of these changes of diameters of aforementioned parts of CBD may be conditioned by the asynchronous growth of different parts of the duodenum [4]. Increase the diameter of the intramural part of CBD was slightly different from previous ones. The acceleration of the growth of its diameter was detected during the 5th month (p<0,001) and 8th-10th months (p<0,01), and deceleration – in fetuses 6-7th month aging and newborns, in last ones a tendency to reduce its diameter has been marked.

Along with it, the character of increasing the diameter of hepatic-pancreatic ampulla (HPA) during the fetal period of ontogenesis (Fig. 3) is a linear.

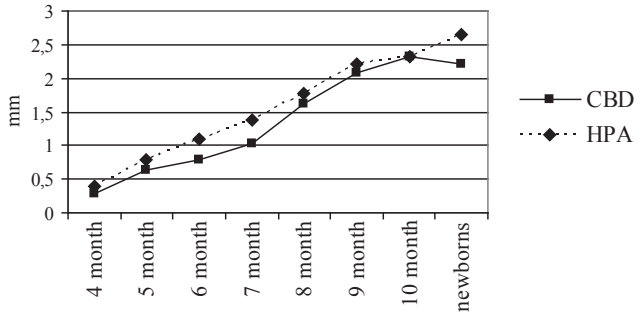

Fig. 3. Comparative dynamics of increasing the diameter of intramural part of common bile duct (CBD) and hepaic-pancreatic ampulla (HPA) one in human fetuses and newborns (M±m).

In the 10th month of PD some slowdown of growth of its diameter is occur. In this period the diameter of HPA is equal to the diameter of intramural part of CBD.

In newborns the diameter of HPA increases and significantly exceed the diameter of intramural part of CBD (p<0,001). Such changes of the sizes of intramural part of CBD and HPA may be associated with the structural changes of duodenum at the conditions of the transition to a new (lactotroph) type of food [4].

The obtained morphological data were the basis of the "Method of determination of criteria for evaluation of the development of common bile duct in fetuses and newborns" [6]. This one can be used for ultrasound and MRI of extrahepatical ducts in the prenatal period and in infants for an early diagnostics of congenital diseases and malformations of biliary system [1, 7].

Conclusions. 1. During the fetal period of human ontogenesis the growth of common bile duct is asynchronous with the periods of acceleration (5-7th and 9-10th months) and delay (8 months). 2. The features of the growth of common bile duct in fetuses in infants are conditioned by the different speed of its parts' changes. 3. The morphological peculiarities of the development of common bile duct were a basis of the original method of determination of criteria for evaluation of the development of common bile duct in fetuses and newborns. 4. The last one can be used as criteria for an evaluation the normal development of common bile duct in human fetuses and newborns also for an early diagnostics of congenital diseases and malformations of the extrahepatic bile ducts.

Prospects of scientific research. In the future, we consider it expedient to study a relative dynamics of morphometric changes of extrahepatic bile ducts and its muscular sphincters in human fetuses and newborns.

References:

1. Magnetic resonance cholangiography: Current and future perspectives / L. Arrivé, M. Hodoul, A. Arbache [et al.] // Clin. Res. Hepatol. Gastroenterol. – 2015. – V.39, №6. – P.659-664.

2. Riabyi S.I. Morphogenesis of the common bile duct constrictors in human fetuses and newborns / S.I. Riabyi, L.I. Haydych, G.I. Macyuk // Clinical anatomy and operative surgery. – 2012. - T.11, №2. - C.14-16.

3. Roskams T. Embryology of extra- and intrahepatic bile ducts, the ductal plate / T. Roskams, V. Desmet // Anat. Rec. – 2008. – Vol. 291. – P. 628-635.

4. Sadler T.W. Langman's medical embryology /13th Ed. / T.W. Sadler – Wolters Kluwer: 2015. – 407p.

5. Terada T. Development of extrahepatic bile duct excluding gall bladder in human fetuses: histological, histochemical, and immunohistochemical analysis. / T. Terada // Microsc. Res. Tech. – 2014. – V. 77 (10). – P. 832-840.

6. Ukraine patent for useful model №44693. Method of determination of criteria for evaluation of the development of common bile duct in fetuses and newborns / Makar B.H., Antoniuk O.P., Riabyi S.I.; appl. 12.05.09; publ. 12.10.09, Bull. Number 19.

7. Usefulness and safety of endoscopic retrograde cholangiopancreatography in children with pancreaticobiliary maljunction / T. Hiramatsu, A. Itoh, H. Kawashima [et al.] // J. Pediatr. Surg. – 2015. – V. 50 (3). – P. 377-381.

8. Veltchev L.M. Bile duct system malformation – embryological and pathological association. Treatment / L.M. Veltchev, M.A. Kalniev, T.A. Todorov // J. of IMAB. – 2009. – V. 15, №1. – P.66-68.